



Biomass North Development Centre

Northern Ontario Bioeconomy Strategy Overview ... and more

Northern Ontario First Nations Environment Conference

October 1, 2015



Today

- Bioeconomy 101
- Biomass North Development Centre - Overview
- Northern Ontario Bioeconomy Strategy
 - Overview
 - Next Steps
- Upcoming events



What is Biomass?

Biological material derived from living or recently living organisms

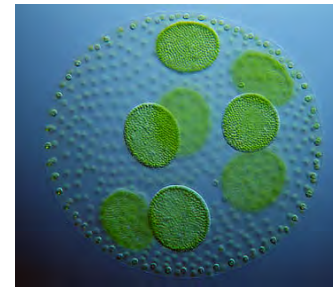
Organic matter renewable over time (human lifespan)



Forestry Crops & Residues



Agri Crops & Residues



Algae



Industrial Wastes



Municipal Solid Waste



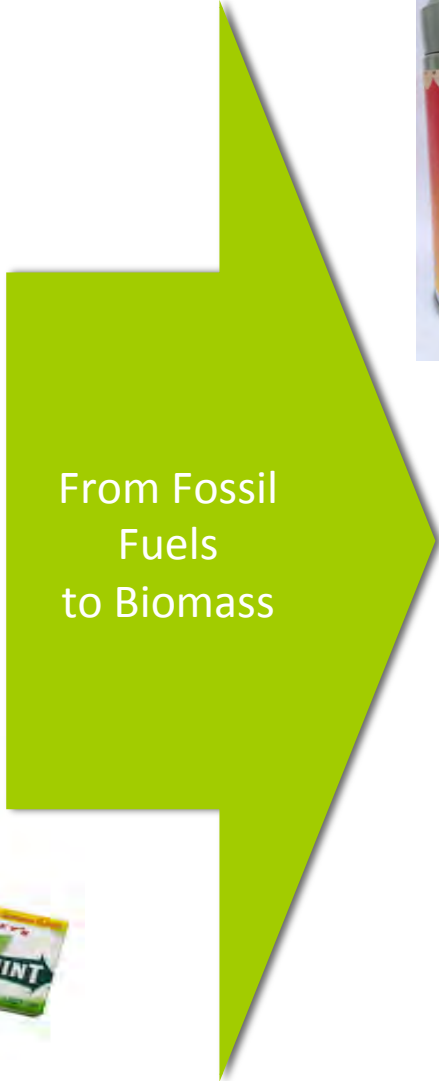
Sewage



Animal Residues



What are Bioproducts?



From Fossil Fuels to Biomass





What is a Bioeconomy?

An economy founded on **biomass** instead of fossil fuels...
where the basic building blocks for
materials, chemicals and energy
are derived from **renewable biological resources**,
such as plant and animal sources

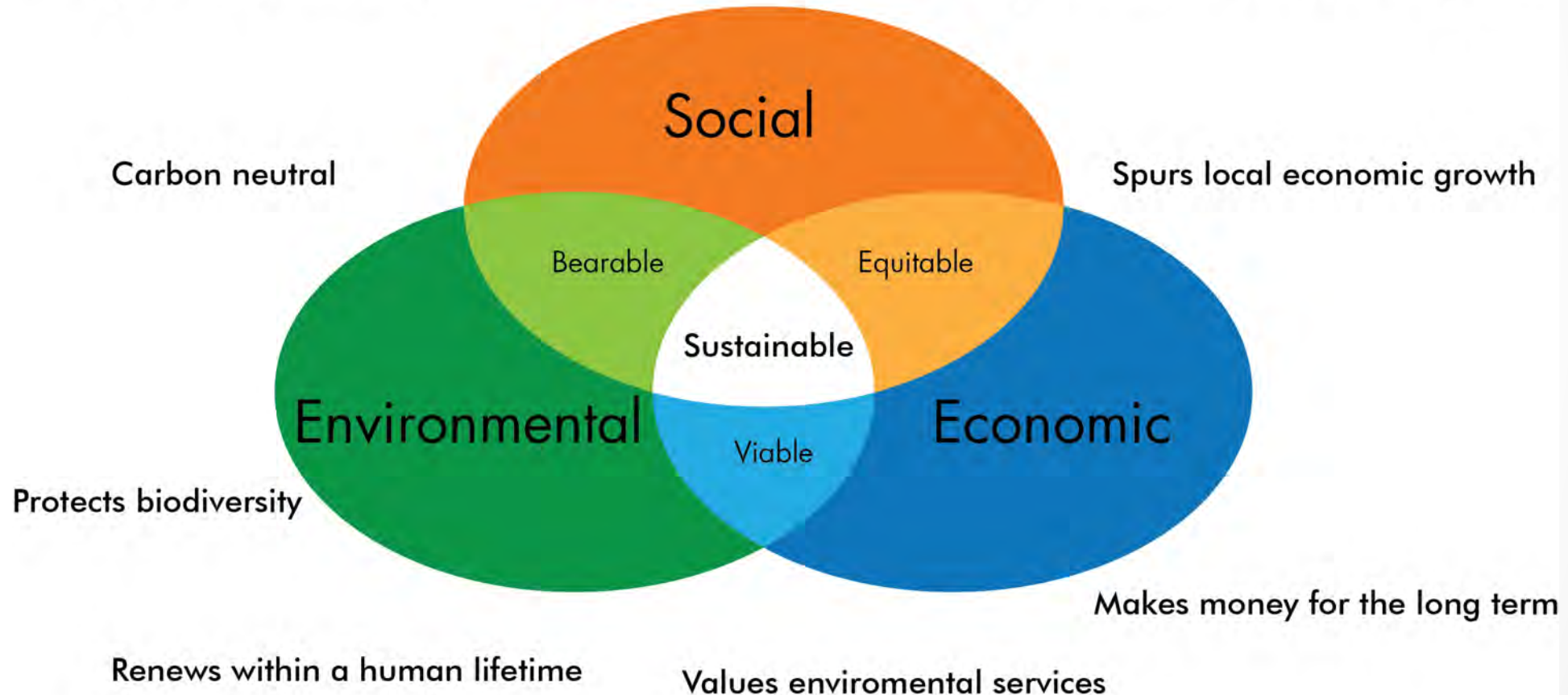
McCormick, Kes and Kautto, Niina, The Bioeconomy in Europe: An Overview, Journal of Sustainability, 2013



What is a Sustainable Bioeconomy?

Respects indigenous and traditional rights

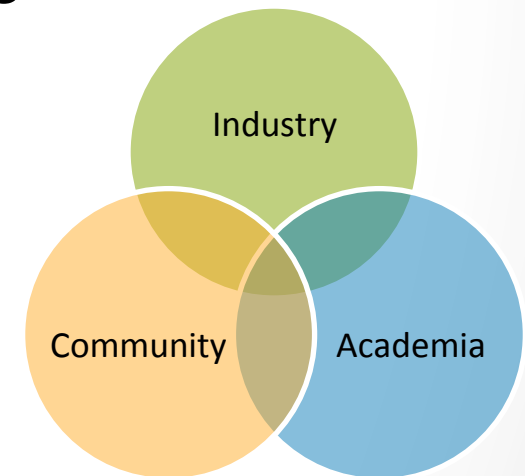
Creates healthy communities and safe workplaces





That was then...

- Biomass Innovation Centre @ Nipissing University
 - Support the development of a sustainable bioeconomy for northern Ontario
- \$1M funding over 5 years- multiple projects
 - OTF Building Skills for the Green Economy
 - FEDNOR/NOHFC – BSR Roadmap/Events
 - IRAP/BIAP – 2 iterations with 10 SME's





This is now....

- May 22, 2015: NipU shut down Biomass Innovation Centre
 - Commitment for Northern Ontario Bioeconomy Strategy “complete”
- July 7: Biomass North Development Centre incorporated
 - Canada Not-for-Profit corporation
 - Flagship project – Implementing the Northern Ontario Bioeconomy Strategy



Biomass North Development Centre

Mandate: Support the development of a robust and sustainable bioeconomy in northern Ontario

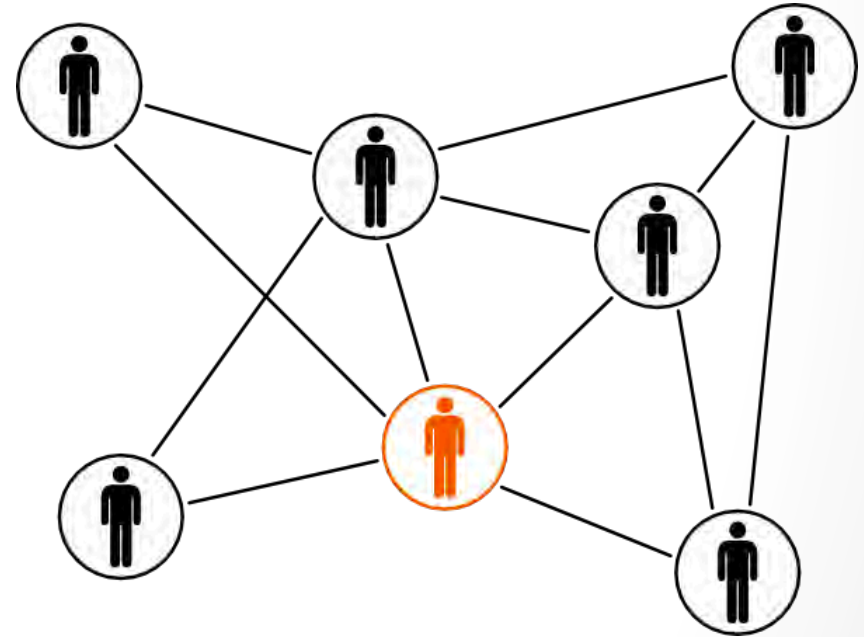
Biomass North is a **membership-based Sector Association** transitioning northern Ontario to a global leader in the bioeconomy





Who is Biomass North?

- Internal:
 - Board of Directors
 - Dawn Lambe, Executive Director
 - Francis Gallo, Project Director
 - Interns, co-ops, volunteers
- Sector Association & Network:
 - Biomass North members
 - You!





Services



Bioeconomy Development



Market & Technical Research



Seminars & Workshops



Tours & Trade Missions



Services - Bioeconomy Development

- Sector association representing supply & bioproduct value chain
- Drive policy & regulatory reform
- Enhance technology transfer & drive innovation
- Develop domestic & export markets for bioproducts
- **One voice** for municipalities, First Nations, and organizations with an interest in the bioeconomy



Services – Market & Technical Research

- Regional roadmap and strategy development
- Market analysis – domestic and international
- Identification of growth opportunities
- Pre-feasibility studies
- Technical comparisons of equipment and systems
- Environmental performance and emissions comparisons
- Develop marketing and promotional materials
- Survey development and management





Services – Market & Technical Research

Eg. Northern Bioeconomy Initiatives I & II

- NRC-IRAP - work with SME's to explore/enter the bioeconomy
- Pre-feasibility for community owned district heating system
- Design off-grid combined heat & power from waste wood
- Market research for bioproduct development park
- Created promotional materials for wood pellet producer



NRC Industrial Research Assistance Program Programme d'aide à la recherche industrielle du CNRC



Services – Seminars & Workshops

- Community and regional seminars
- Develop new programs, curriculum, and learning materials for northern colleges and universities
- Design charrettes to develop bioenergy and bioproduct solutions that meet local needs
- PDH-eligible training sessions and knowledge workshops for engineers and technologists





Services – Seminars & Workshops

Eg. Building Skills for the Green Economy

- Ontario Trillium Foundation grant
 - 6 Sustainable Biomass Harvesting community seminars
 - 6 Community Energy workshops
 - PDH-eligible training sessions





Services – Tours & Trade Missions

- Single-day tours of facilities and communities
- Multi-day regional tours of bioenergy and bioproduct facilities
- International trade missions





Services – Tours & Trade Missions

Eg. Northern Ontario Bioenergy Tour

- Nov 4-8th 2014
- Finnish and Swedish bioeconomy experts seeking business partnerships in Ontario
- Presentations and B2B meetings





UPCOMING TOUR: Nordic Bioeconomy Trade Mission

- End of May/beginning of June 2016
- Begins in Stockholm for International Wood Biorefining Week (May 24-26)
 - World Bioenergy
 - International Pulp & Paper Week
 - Bioeconomy Innovation Forum
- Take ferry to Finland for series of facility tours, B2B meetings, cultural appreciation, etc.





Sector Association - Membership

Join our sector association:

- News and updates relating to the Ontario bioeconomy
- Connections to our network of bioeconomy champions
- Information on emerging market opportunities
- Policy & regulatory updates relating to forestry, biomass, energy, environmental compliance and more
- Priority and discounted rates on our services and events



Sector Association - Membership

Public Members

- First Nations
- Municipalities
- EDCs
- Academia
- Industry associations

SME Members

- Consultants/Engineers
- Forest license holders
- Bioenergy/bioproducer producers
- Equipment providers
- Forest harvesters

Large Enterprise

- Forest resource processing facilities
- Large industrial and commercial
- Manufacturing facilities

	Allies	Public Members*		Small-to-Medium Enterprise Members*		Large Enterprise Members*	
Annual Rate	Free	Standard	Premium	Standard	Premium	Standard	Premium
		\$300	\$500	\$600	\$800	\$1000	\$1300

*Refer to our website for details

Member Benefits	Ally	Standard Membership	Premium Membership
Become a proven leader in the bioeconomy!	✓	✓	✓
Receive news and updates relating to the Ontario bioeconomy	✓	✓	✓
Ability to participate in policy and regulatory communications, submissions, etc.	✓	✓	✓
Priority access to Biomass North's market research and data		✓	✓
Priority insights to development opportunities		✓	✓
Organization listing in our member directory		✓	✓
Invitation to participate and vote in annual AGM		✓	✓
Discounted rates for conference and events, workshops, consulting services, tours and more		✓	✓
Member rates for sponsorship and trade-show opportunities at conference and events		✓	✓
Member rates for advertising in Biomass North newsletter and materials		✓	✓
Banner/logo on Biomass North website			✓
Two hours of free consulting services			✓
Premium rates for sponsorship and trade-show opportunities at conference and events			✓
Premium rates for advertising in Biomass North newsletter and materials			✓
Priority consideration for speaking opportunities			✓
Discounted rates for external events			✓



UPCOMING EVENT:

Naturallia 2015 - Nov 11-13th, Sudbury

- Designed to connect businesses and facilitate local, regional, national and international exchanges
- “Speed dating” for businesses in the natural resources sectors:
 - Value-added Forest Products & Processes
 - Mining Supply and Services
 - Smart Energy Development, Supply and Services
 - Advanced Manufacturing
- Join our Northern Bioeconomy Delegation!





Northern Ontario Bioeconomy Strategy



Union of Ontario Indians & Nipissing University/Biomass Innovation Centre



Background

- Summer 2014 – Union of Ontario Indians (UOI) and Biomass Innovation Centre (BIC) begin series of discussions
- Numerous opportunities for northern First Nations, municipalities & business in the emerging bioeconomy...
- Numerous roadblocks/barriers preventing growth of sector
- What's missing = overarching strategy
- July 2014 - UOI and BIC sign MOU
- NO-BS!





Why NO-BS?





Economic Recovery of Key Sector

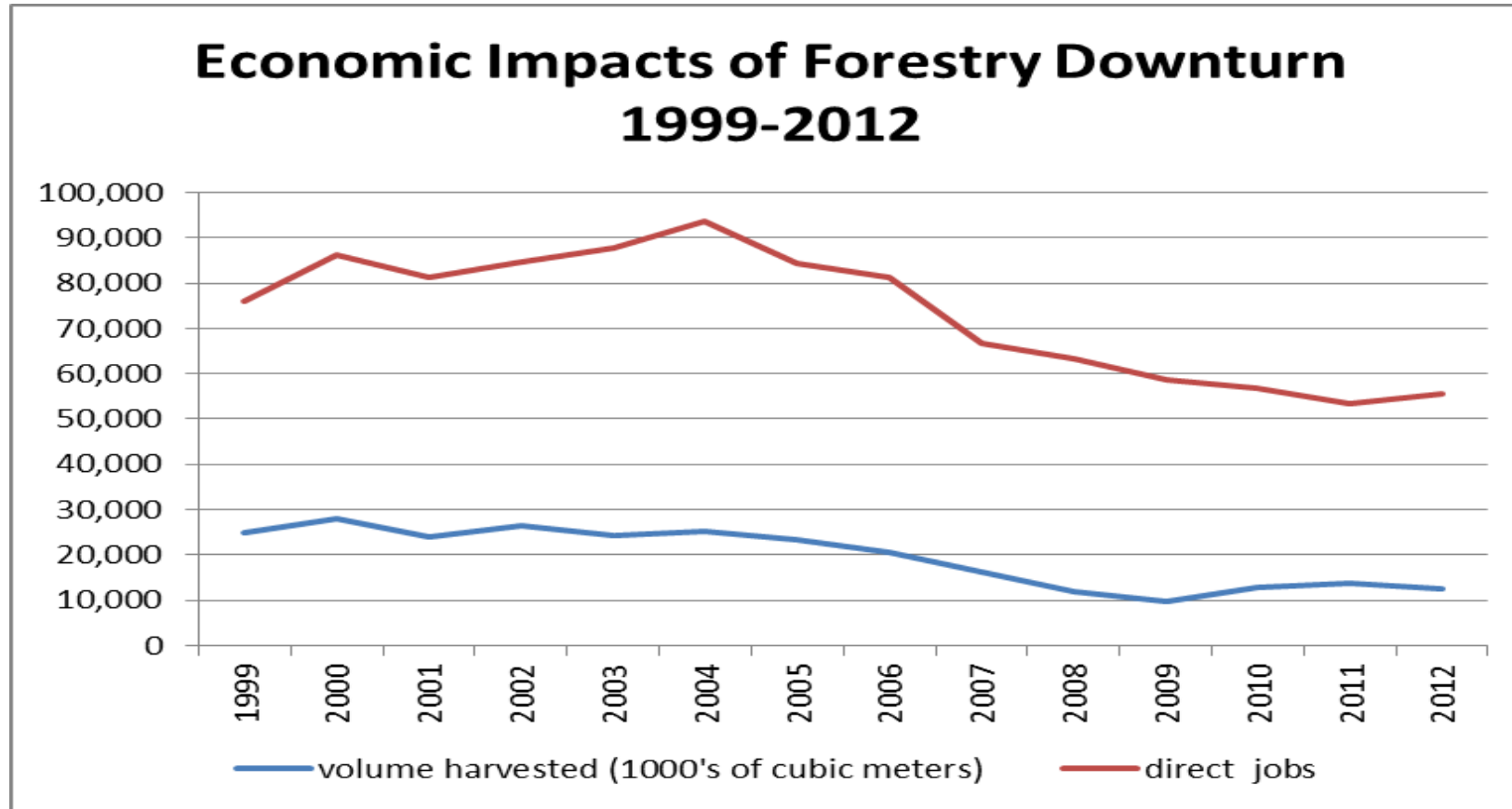


Figure - Economic Impacts of Forestry Downturn 1999-2012
Source: Natural Resources Canada Statistical Data,
<https://cfs.nrcan.gc.ca/statsprofile/employment/on>



Heat Need > Electricity Need

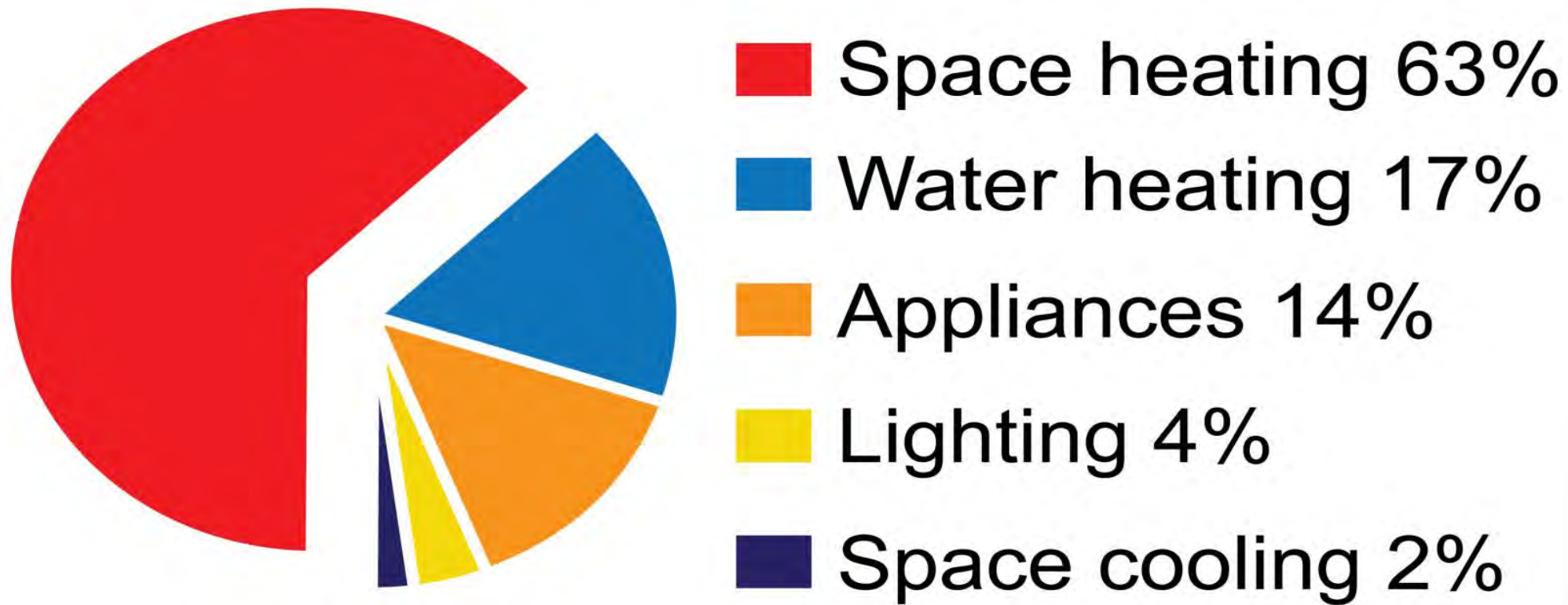
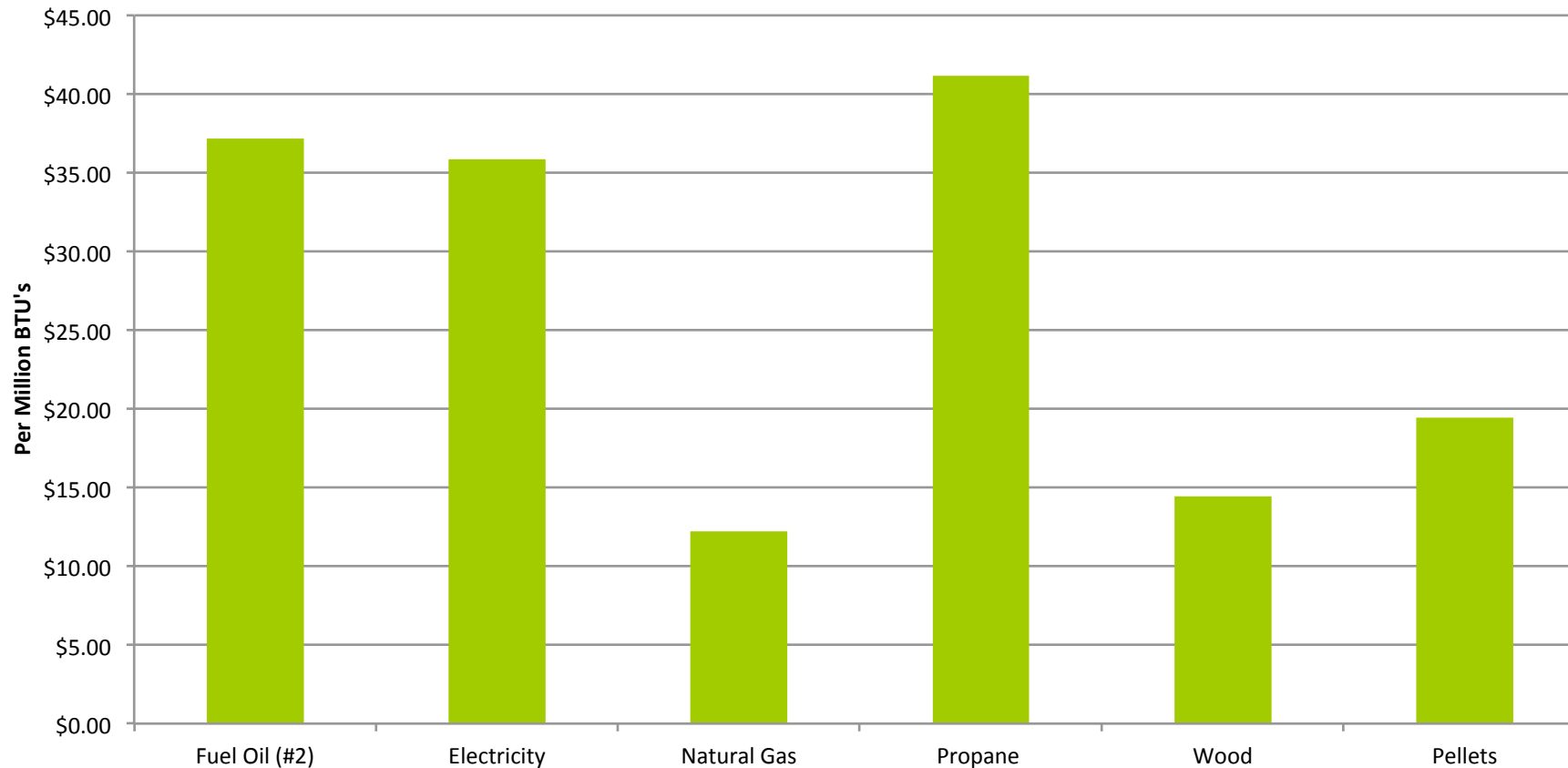


Figure - Residential Energy Use in Canada by activity, 2010 Source: Energy Efficiency Trends in Canada 1990-2010, Natural Resources Canada. <http://www.nrcan.gc.ca/energy/products/categories/heating/13740>



Wood Energy = Cheaper Energy

Heating Fuel Cost Comparison



Fuel Cost Comparison Spreadsheet: Energy Information Agency, US Government. <http://www.eia.gov/tools/faqs/heatcalc.xls>



Bioenergy creates jobs...

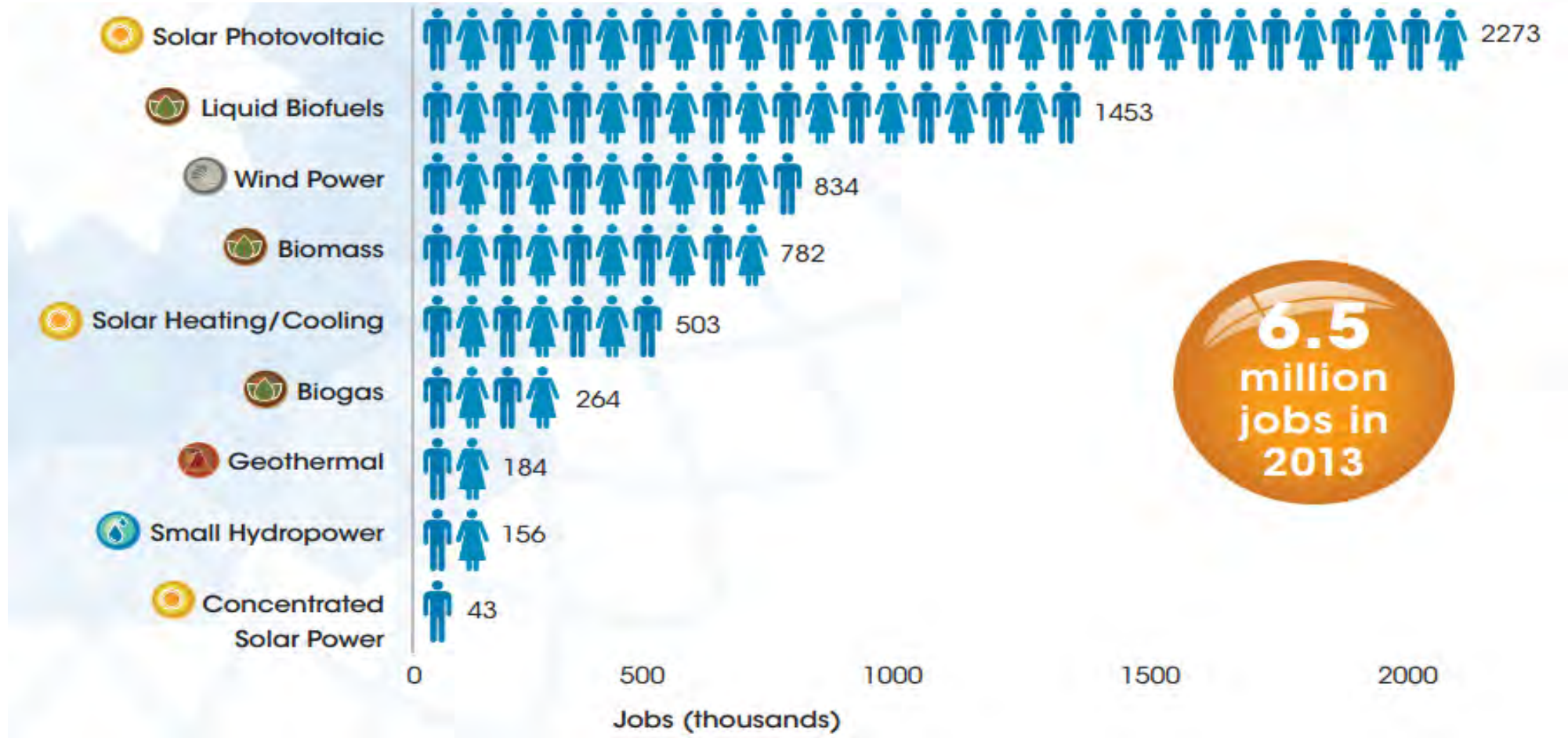


Figure - Renewable Energy Employment by Technology Source: IRENA Renewable Energy and Jobs Report, 2014 <http://www.irena.org/publications/rejobs-annual-review-2014.pdf>



Biochemicals and Biocomposites

CHEMICAL SECTOR	2010	2025
Commodity Chemicals	1-2 percent	6-10 percent
Specialty Chemicals	20-25 percent	45-50 percent
Fine Chemicals	20-25 percent	45-50 percent
Polymers	5-10 percent	10-20 percent

Figure - World Biobased Market Penetration 2010-2025 Source: USDA, U.S. Biobased Product Market Potential and Projections https://www.bio.org/sites/default/files/20100310_biobased_chemicals.pdf



Reduce GHG's

Annual total CO₂ emissions to heat a typical house (20,000 kWh/yr)

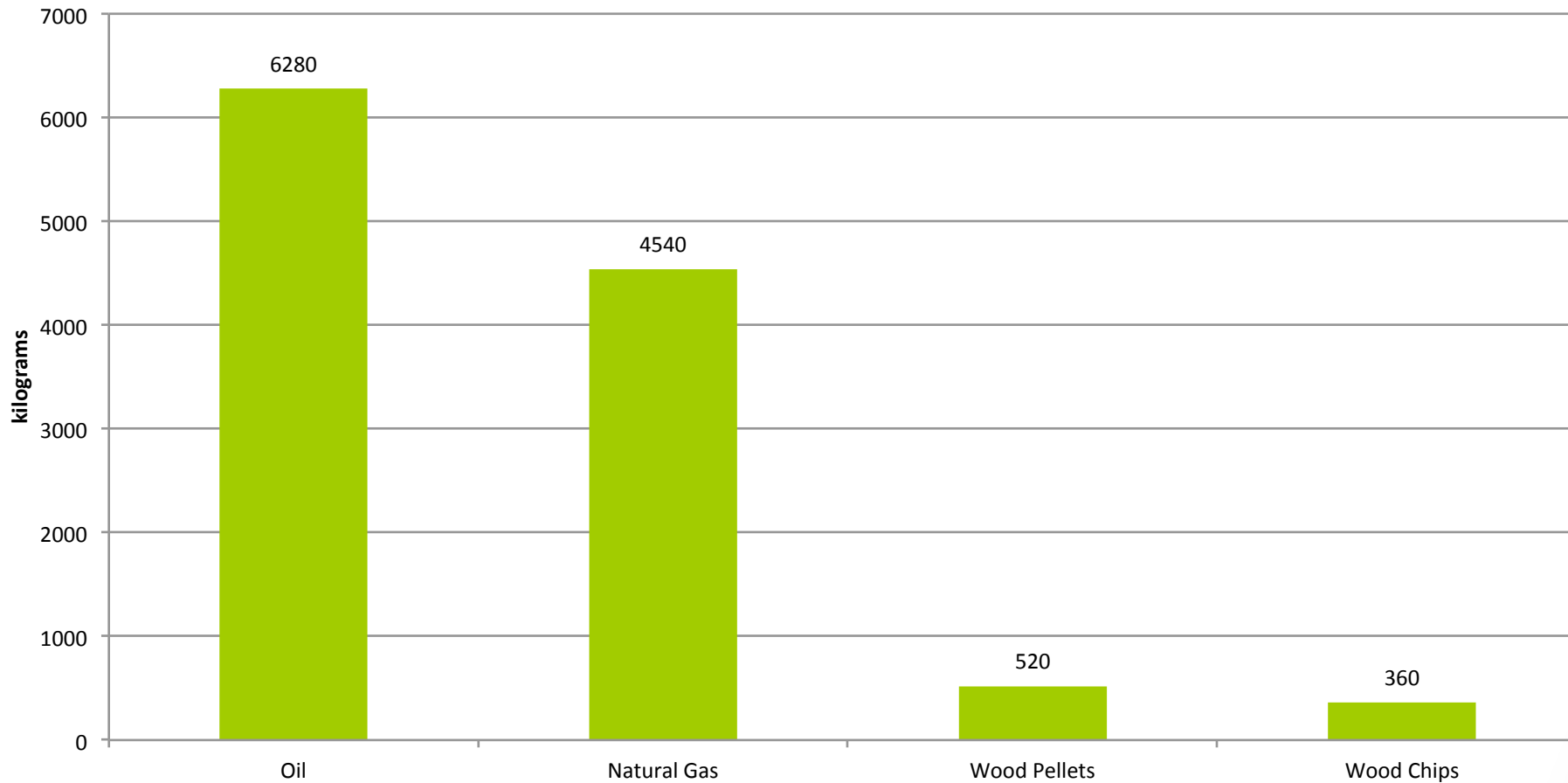


Figure - GHG Emissions from different heating fuel types Source: Biomass Energy Centre http://www.biomassenergycentre.org.uk/portal/page?_pageid=75,163182&_dad=portal&_schema=PORTAL



And...

- Preserve traditional knowledge
- Reverse youth out-migration
- Ensure benefits flow locally
- Invest in social and physical infrastructure
- Reduce dependence on outside money



... so what's the hold up?





Reality Check



- Little evidence of benefit-sharing with northern First Nations and municipalities
- Challenges securing supply
- The north unable to enter the new energy economy
- Little focus on domestic bio-energy market
- Remote communities powered by diesel
- Outdated legislation and regulations
- Focus on agri-biomass innovation
- Fragmented policy

No over-arching strategy



Northern Ontario Bioeconomy Strategy



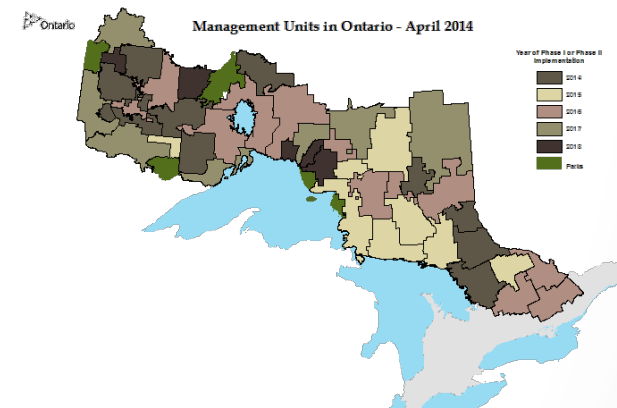


GOALS - Sustainable Supply



Sustainable
Supply

- ▶ Long term supply security
- ▶ Benefit-sharing and equity
- ▶ Technology innovation





GOALS - Bioenergy and Biofuels



Bioenergy
& Biofuels

- ▶ Participate in export market
- ▶ Develop domestic market
- ▶ Build heat entrepreneurship models





GOALS - Biochemicals & Biocomposites



Biocomposites
& Biochemicals

- Produce higher-value bioproducts
- Increase capacity for innovation
- Leverage advanced manufacturing





GOALS - Traditional Medicines & Food Security



Medicines
& Foods

- Establish new markets for traditional foods, medicines, knowledge
- Food security in remote northern communities





Northern Ontario Bioeconomy Strategy



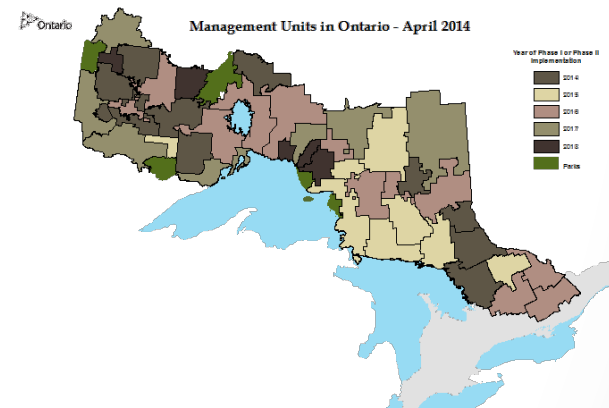


Sustainable Supply



Sustainable
Supply

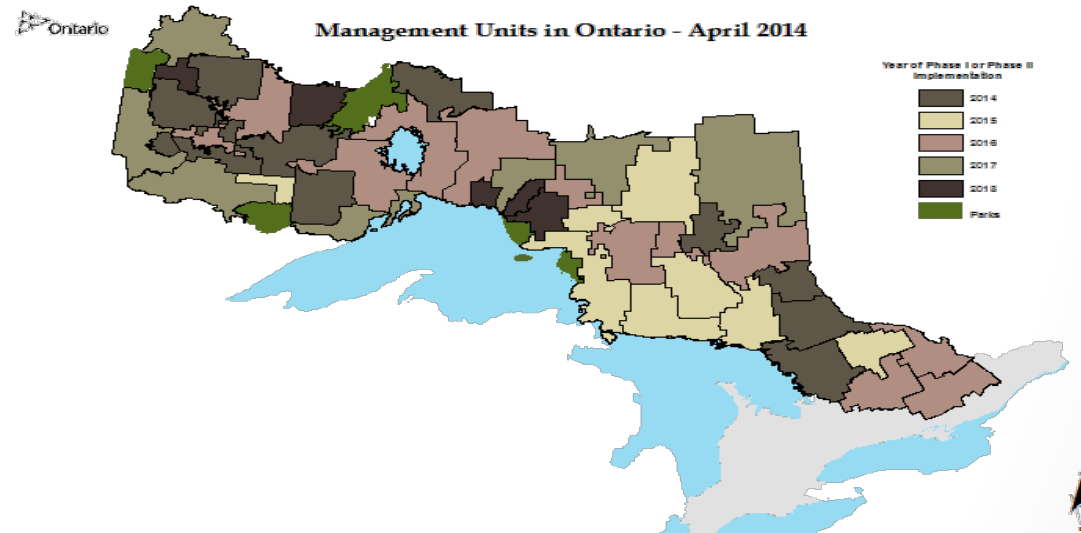
- Establish community forest cooperatives
- Build regional aggregators
- Modernize forest harvesting equipment & practices





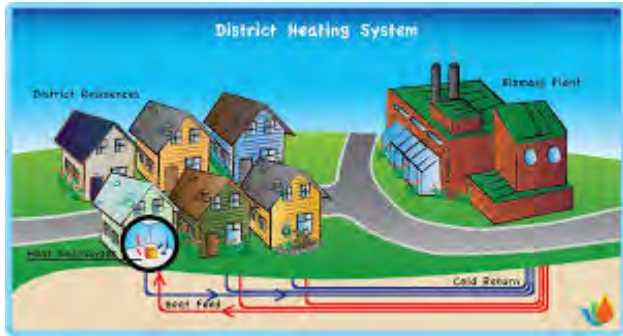
Community Forest

- Nawiinginokiima Forest Management Corporation
- Pic River FN, Pic Moberg FN, Hornepayne AC, Marathon, Hornepayne, Manitouwadge and White River





Regional Aggregator



Regional Aggregator
Secures supply through many ST contracts
Offers customers LT contracts





Harvest Modernization



Test the latest technologies and equipment

Learn about forestry workforce transformation

Modernize your harvesting practices to maximize value



Biomass North Development Centre
presents the

2015 Forestry Automation Expo

November 10 2015
10 am to 5 pm
Sudbury, Ontario
Howard Johnson Plaza
50 Brady Street, Sudbury, ON P3E 1C8



Bioenergy & Biofuels



Bioenergy
& Biofuels

- ▶ Develop wood pellet mills
- ▶ Implement the “100km heat diet”
- ▶ Build district heating solutions
- ▶ Establish combined heat and power
- ▶ Convert commercial/municipal buildings





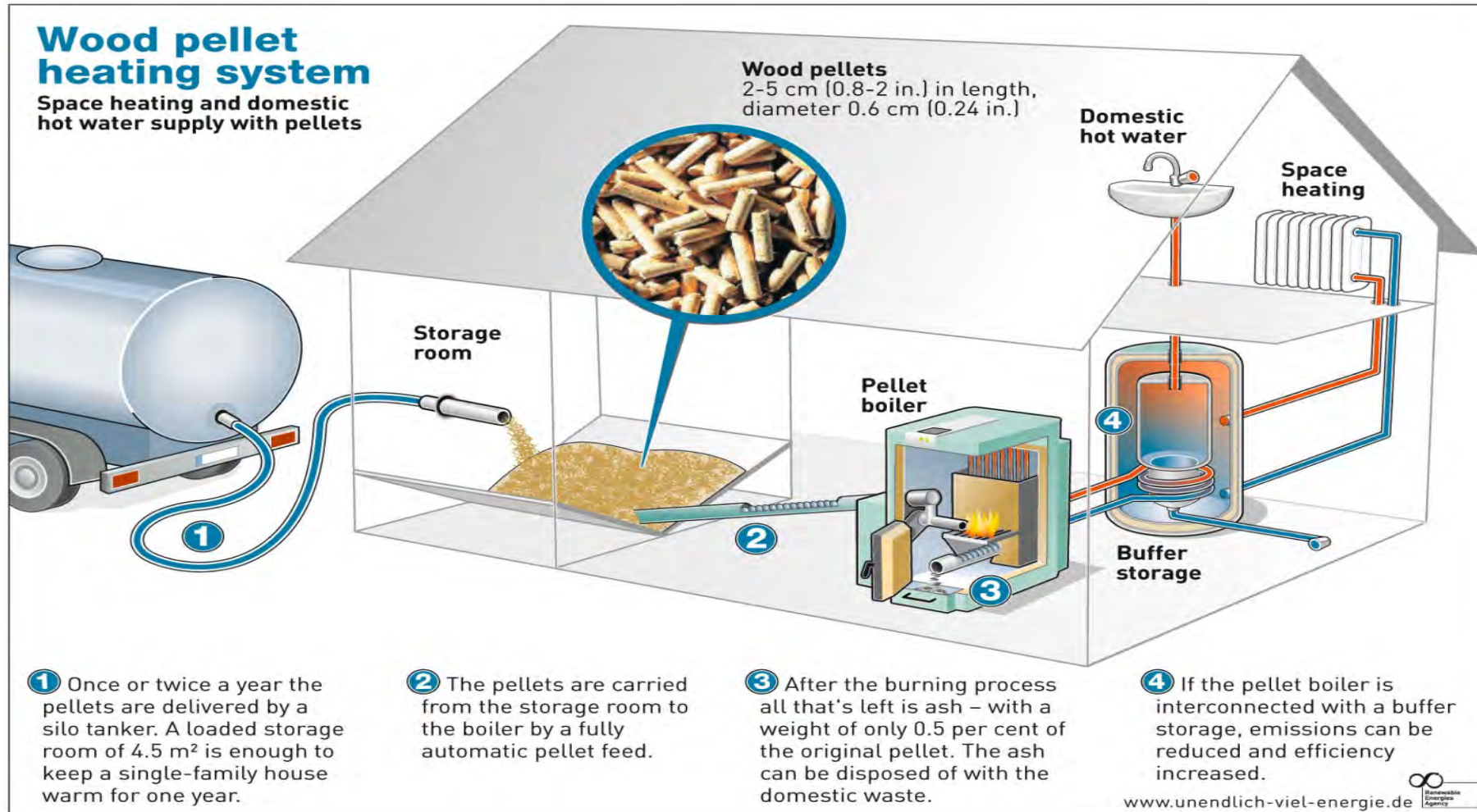
Export Pellet Mill

GLOBAL PELLET CONSUMPTION – 2015 AND 2020 OUTLOOK



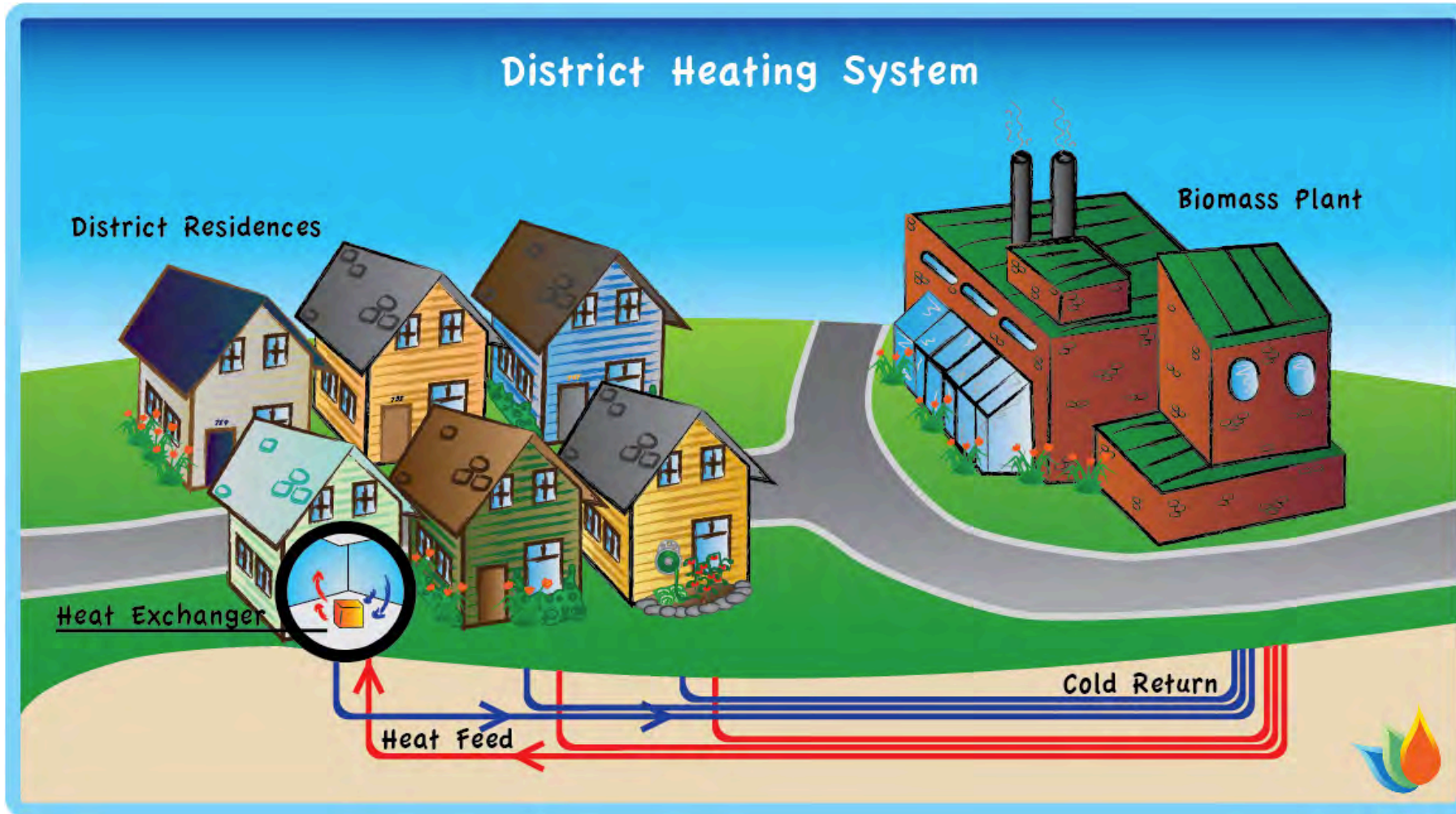


100km Heat Diet





District Heating



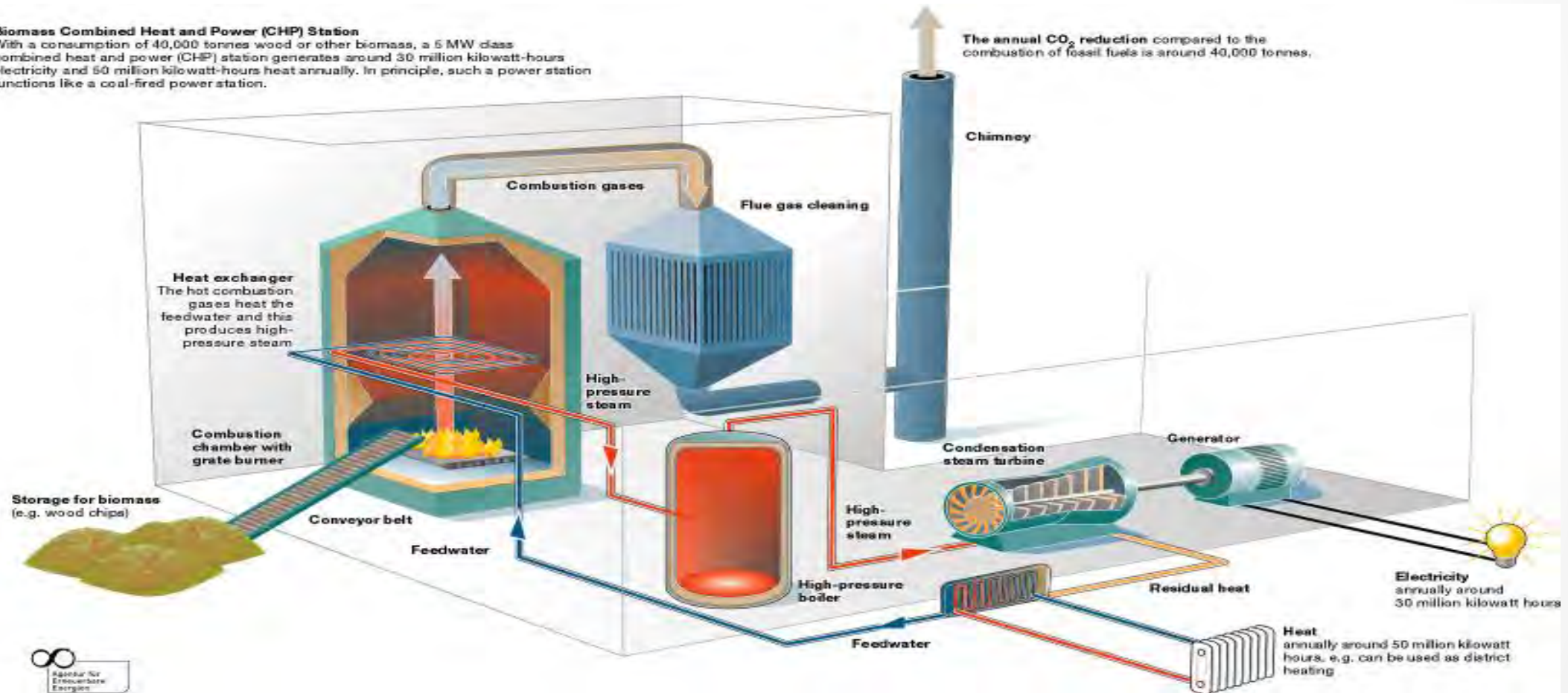


Combined Heat & Power (CHP)

Biomass Combined Heat and Power (CHP) Station

With a consumption of 40,000 tonnes wood or other biomass, a 5 MW class combined heat and power (CHP) station generates around 30 million kilowatt-hours electricity and 50 million kilowatt-hours heat annually. In principle, such a power station functions like a coal-fired power station.

The annual CO₂ reduction compared to the combustion of fossil fuels is around 40,000 tonnes.





Commercial/MUSH Conversion





Biocomposites & Biochemicals



Biocomposites
& Biochemicals

- Phase 1
 - Manufacturer - engineered wood products
 - Light manufacturing bioproduct park
- Phase 2
 - Industrial biochemical and biocomposite production





CLT and EW



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<http://www.nrc-cnrc.gc.ca/eng/solutions/collaborative/mrwb.html>



<http://unalam.blogspot.ca/2012/06/choose-glulam-by-una-lam-over-other.html>



Traditional Medicines and Food Security



Medicines
& Foods

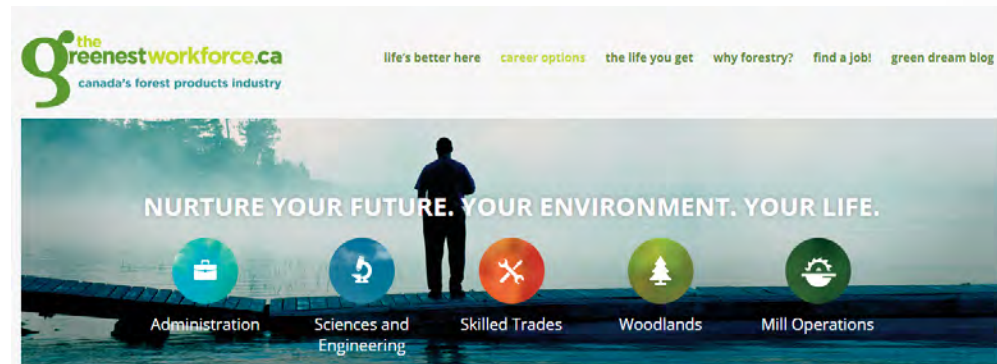
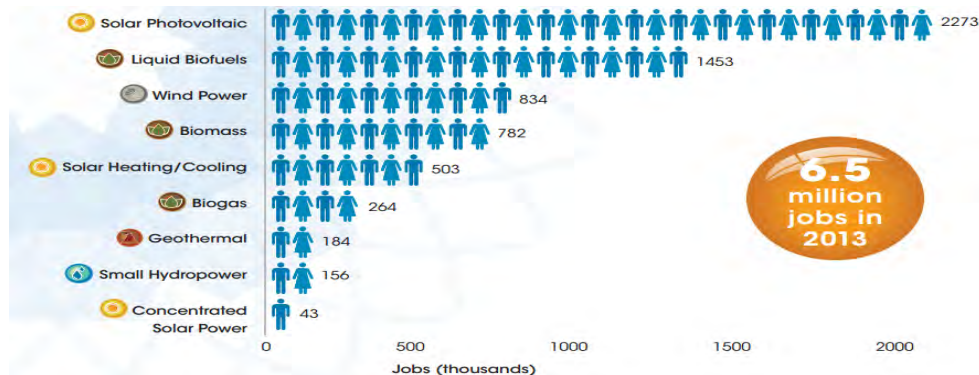
- Establish new markets for traditional foods, medicines, knowledge
- Build biomass-heated greenhouses in remote northern communities





Skills & Training

- Identify skills gaps with industry partners
- Work with MTCU to develop diploma programs
- Partner with community college to develop training programs
- Capture traditional bioeconomy knowledge and skills
- Leverage curriculum developed under BIC-OTF project





Policy and Regulatory Reform

- Establish task force
- Identify key policy barriers
 - MOE&CC – Environmental Compliance Approvals
 - MOE&CC – Renewable Energy Approval
 - MNR&F - Forest tenure reform
 - MOE – Electricity vs Energy
 - MG&CS – TSSA boiler regulations
 - MAF&RA – Agricultural exemptions
 - Business – insurance and capex financing
- Leverage international best practices





Model Bioeconomy Region

- No access to natural gas = huge energy costs
- Economic collapse after forestry downturn
- Youth outmigration, shuttered commercial sector, unemployment 10% > than avg
- First community – managed forest in the new tenure model
- Nawiinginiima - Ojibway word for “working together”
 - Ojibways of the Pic River First Nation, Pic Moberg First Nation, Hornepayne Aboriginal community, Marathon, Terrace Bay, Hornepayne, Manitouwadge and White River



- District heating with biomass
- 100 km heat diet
- Mush sector conversion
- Bioproduct light manufacturing
- Greenhouses



Progress and Timeframe

- Signed MOU (JUL 2014)
- Develop NO-BS framework (AUG-DEC 2014)
- Northern Ontario Consultation Sessions (JAN-APR 2015)
- ID potential project locations & partners (JAN 15-ongoing)
- Finalize the strategy for UOI (MAY 2015)
- Secure funding to pre-implement the strategy (currently)
- Develop model/foundational projects (2016-2020)



Next Steps: Demonstration Projects

Key Activities:

- Qualify and Prioritize Potential Projects
 - Score cards to rank each potential project
 - ID and establish working groups for each project
- Planning and early implementation of priority projects
 - Develop project plans with working groups for each project



Next Steps: Skilled & Trained Ontario Workforce

Key Activities:

- Develop a Skills and Training Plan to support Ontario's forest bioeconomy
 - ID necessary skills, infrastructure & human resources
 - Strengthen partnerships between academia & industry
 - Develop plan/roadmap to coordinate skills & training



Next Steps:

Business-Ready Policy & Reg Framework

Key Activities:

- Research and reporting on Ontario policy and regulatory landscape
 - Summary report of policy & regulatory barriers
- Establish a task force to address policy and regulatory barriers to the Ontario bioeconomy
 - Composed of government, First Nations and industry leaders



Next Steps: Engaged and Informed Ontario

Key Activities:

- Outreach and engagement to promote NO-BS
 - Develop public/glossy version of NO-BS
 - Develop information package – FAQ's, fact sheets, video
- NO-BS events and other event participation
 - Workshops and events



Project Drill-down

- Community Forest Co-op
- Regional Aggregator
- Harvesting Modernization

- Export pellet mill
- 100 km Heat Diet
- District Heating
- Combined Heat & Power (Cogen)
- Commercial/MUSH conversion

- CLT/EW project
- Light manufacturing bioproduct park

- Traditional food/medicines to “market”
- Biomass-heated greenhouses





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